

15 JUNE 1966



MODEL #222 ILLUSTRATED

DIRECT READING TYPE  
**PUNCHED TAPE PROGRAMMERS**  
MODELS WITH UP TO 82 LOAD CIRCUITS

**GENERAL DESCRIPTION**

The programmers described in this Bulletin are designed to fill the need for a multi-circuit control device offering the flexibility of punched tape and a direct reading system that eliminates the requirement for elaborate memory devices, or special coding.

A unique method of reading and controlling load circuits is employed in these programmers. This method uses brushes which complete a load circuit through a hole in the tape. These brushes are so designed as to provide a "make before break" switch closure when two or more holes are read in a tape channel. This switch closure is sustained for as long as the channel is punched with successive holes.

The punched tape is driven by one of three methods: A synchronous motor, a stepping/fast advance drive, or a variable speed drive. Reading speeds as fast as 30 lines per second are available with one of these three drives.

Since the Tape Programmers are direct reading, the tape must be rugged, have a high insulation capacity, and eliminate static electricity. Hence a special rope paper/mylar laminate tape was developed which not only has the required qualities, but also has a surface texture that continuously cleans the brush ends, adding to the reliability of the system.

Pat. Applied For.

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**INDUSTRIAL  
TIMER**   
CORPORATION

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LOS ANGELES, CALIFORNIA, 90007

 **AMERCON**  
Company

UNIT COMPLETE



READING HEAD  
WITHOUT COVER



STEP DRIVE  
WITHOUT COVER



## 12-22-42-82 CHANNEL TAPE PROGRAMMERS

### GENERAL INFORMATION

The 12, 22, 42, and 82 channel programmers differ only in the number of load circuits and protruding dimensions. All drive and electrical specifications for these units are identical.

### MODELS 012,112,122,142, AND 182 — SYNCHRONOUS DRIVE

These tape readers are driven by a synchronous motor and offer many reading speeds ranging from 1 to 30 lines per second. A simple modification of this unit uses one channel for control of the synchronous motor so that the tape will make one complete circuit through the reading head and then home to a start position.

The Model 012 designates that the unit is mounted on a 6" x 6" panel. The Model 112 is mounted on a standard 7" x 19" rack panel.

### MODELS 212, 222, 242, AND 282 — STEPPING/FAST ADVANCE DRIVE

The stepping drive advances the tape through the reader line by line upon receipt of a simple switch closure. Movement of the tape occurs instantly upon receipt of a  $\frac{1}{10}$  sec. or longer pulse. A sustained switch closure will advance the tape one position. Maximum standard stepping speed is 4 lines per second.

The stepping drive system also provides a fast advance which transports the tape at a speed of 15 lines per second. The determination of step or fast advance is generally made by punched holes in the tape, using one channel to signal the unit. (Please see wiring schematic.)

NOTE: The fast advance speed can be supplied on special order at rates other than 15 lines per second, or adjustable from a dial located on the panel.

### MODELS 312, 322, 342, AND 382 — ADJUSTABLE SPEED DRIVE

This provides a solid state variable speed drive, adjustable from speeds of 1 to 30 lines per second in several ratios. Speed adjustment can be made while the equipment is operating. Additional speed ranges available; consult the factory.

### READING METHOD

Make before break brushes (steel with hardened tips), to common drum.

### CURRENT CAPACITY

1/4 amps. per channel, non inductive rated at 115/60.

## CURRENT SUPPLY

Common drum with feeder brushes — 5 amps. non inductive per feeder. (Two feeder brushes equipped, additional upon request.)

## LOAD CIRCUIT CONNECTIONS

Tapered pin from brush assembly to load.

## TAPE SPECIFICATIONS

Rope paper/Mylar laminate — .0075" thick. See chart for widths.

Width	Part Number	Prices
12 Channel - 1.375	99 - 589	\$1.00 per ft.
22 Channel - 2.905	99 - 543	\$1.50 per ft.
42 Channel - 4.645	99 - 544	\$1.50 per ft.
82 Channel - 8.125	99 - 546	\$1.50 per ft.
Mylar patching tape	99 - 588	\$4.00 per roll
Splicing tape	99 - 610	\$1.75 per roll

## MOUNTING

Relay Rack mount - 7 x 19 inches (177mm x 482mm) - (or Model 012 which is built on 6" x 6" panel).

## VOLTAGES

115 or 220 A.C.

NOTE: Through slight alterations in internal circuitry, the common drum can be isolated, and control voltages other than the drive voltage can be brought out to the load circuits.

## TAPE PREPARATION

A channel can be punched along the lateral or longitudinal axis of the tape.

## DRIVE TYPE, ALL MODELS VOLTAGE

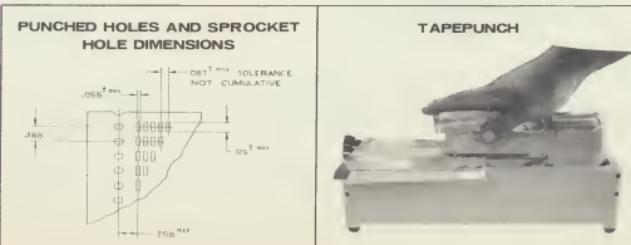
Synchronous	115/60 or 50 cycles - 220/60 or 50 cycles
Stepping/fast advance	115/60 (use step down transformer for 220 A.C.)
Variable	115 or 220 A.C. (D.C. available upon request)

## LOAD RATING

.250 amps. non inductive per channel.

## INPUT TO COMMON DRUM

Tapered pin from brush assembly.

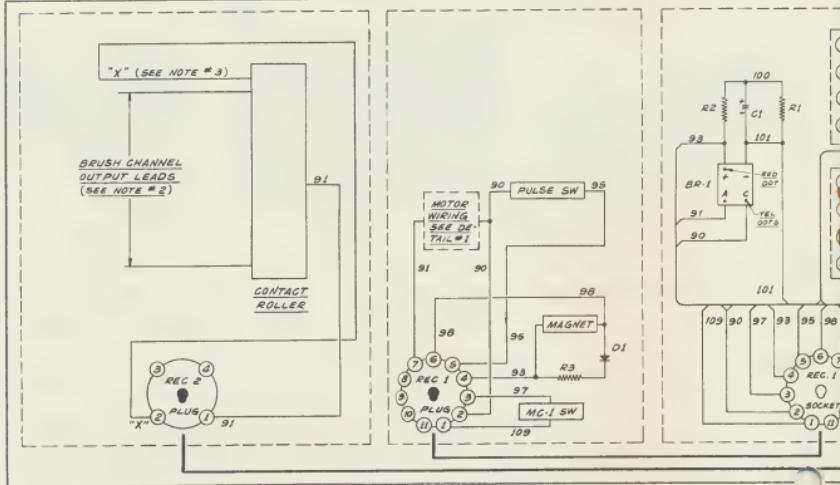


# ELECTRICAL

TAPE READING HEAD

CLUTCH TYPE STEPPING DRIVE

POWER SUPPLY



FRONT PANEL, REAR VIEW

NOTES

- 1. ALL ITEMS SHOWN FROM WIRING SIDE
- 2. NUMBER OF BRUSH CHANNEL CHANNEL  
OUTPUT LEADS DEPENDS UPON THE  
MODEL OF TAPE READER SELECTED.

MODEL NO	BRUSH CHANNEL OUTPUT LEADS
182	— 81
142	— 41
122	— 21
112	— 11

- 3. "X" (82, 42, 22 or 12 ACCORDINGLY) LAST  
BRUSH CHANNEL OUTPUT LEAD ON ANY  
MODEL TAPE READER GOES TO FAST  
ADVANCE RELAY COIL, CONTACT NO. II

WIRE GAUGE  
XX DENOTES #24 GAUGE  
XX " #18 "

COLOR CODE

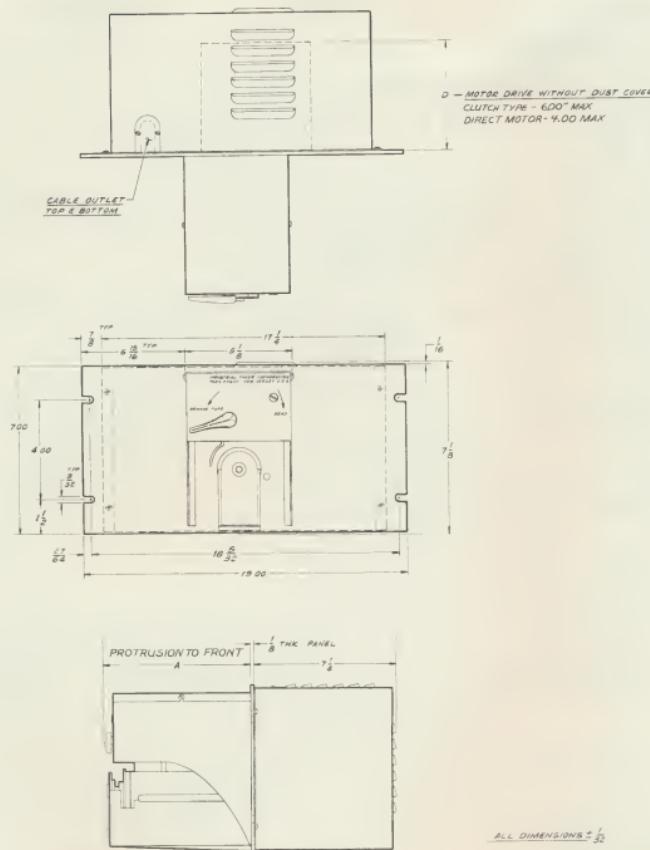
BLACK	BROWN	RED	ORANGE	YELLOW	SEEN	BLUE	VIOLET	GRAY	WHITE
1-81 41-61-	2-22 42-62	3-23 43-63	4-24 44-64	5-25 45-65	6-26 46-66	7-27 47-67	8-28 48-68	9-29 49-69	10-30 50-70
81-91 100	82			95	96	97	98-108	99-109	90-
BLK-WH	BRN-WH	RED-WH	OR-WH	YEL-WH	GR-WH	BLUE-WH	VOL-WH	GRAY-WH	RED-BLK-WH
11-31 51-71-	12-32 52-72-	13-33 53-73	14-34 54-74	15-35 55-75	16-36 56-76	17-37 57-77	18-38 58-78	19-39 59-79	20-40 60-80
101		93							

WIRING DIAGRAM

1	FA - FAST
1	L - LOCK
1	P - PULS
0/1	



## **DIMENSIONAL DRAWING**



## DIMENSIONAL SPECIFICATIONS

Model	Width	Height	Depth	Protrusion to Front
012	6"	6"	4"	2½"
112	19"	7"	7¼"	3⅓"
122, 222, 322	19"	7"	7¼"	4⅓"
142, 242, 342	19"	7"	7¼"	6⅓"
182, 282, 383	19"	7"	7¼"	9⅓"

**MODEL NUMBER & PRICE LIST**

MODEL	CATALOG #	CHANNELS	DRIVE TYPE	VOLTAGE	PRICE	PANEL TYPE
012		12	Synchronous, 1, 2, 3, 4, 5, 10, 20, 30 LPS	115/60	\$300.00	6" x 6"
012		12	Synchronous, 1, 2, 3, 4, 5, 10, 20, 30 LPS	115/50	\$300.00	6" x 6"
012		12	Synchronous, 1, 2, 3, 4, 5, 10, 20, 30 LPS	230/60	\$310.00	6" x 6"
012		12	Synchronous, 1, 2, 3, 4, 5, 10, 20, 30 LPS	230/50	\$310.00	6" x 6"
112		12	Synchronous, 1, 2, 3, 4, 5, 10, 20, 30 LPS	115/60	\$300.00	Relay Rack
112		12	Synchronous, 1, 2, 3, 4, 5, 10, 20, 30 LPS	115/50	\$300.00	Relay Rack
112		12	Synchronous, 1, 2, 3, 4, 5, 10, 20, 30 LPS	230/60	\$310.00	Relay Rack
112		12	Synchronous, 1, 2, 3, 4, 5, 10, 20, 30 LPS	230/50	\$310.00	Relay Rack
212	600-842	12	Stepping Drive with Fast Adv.	115/60	\$350.00	Relay Rack
212	600-844	12	Stepping Drive Fast Advance	220/60	\$360.00	Relay Rack
312	600-856	12	Variable Speed Drive	115/60	\$350.00	Relay Rack
312	600-858	12	Variable Speed Drive	220/60	\$360.00	Relay Rack
122		22	Synchronous, 1, 2, 3, 5, 6, 10, 15, 30 LPS	115/60	\$340.00	Relay Rack
122		22	Synchronous, 1, 2, 3, 5, 6, 10, 15, 30 LPS	115/50	\$340.00	Relay Rack
122		22	Synchronous, 1, 2, 3, 5, 6, 10, 15, 30 LPS	230/60	\$350.00	Relay Rack
122		22	Synchronous, 1, 2, 3, 5, 6, 10, 15, 30 LPS	230/50	\$350.00	Relay Rack
222	601-290	22	Stepping Drive /Fast Advance	115/60	\$390.00	Relay Rack
222	601-292	22	Stepping Drive Fast Advance	220/60	\$400.00	Relay Rack
322	601-304	22	Variable Speed Drive	115/60	\$390.00	Relay Rack
322	601-306	22	Variable Speed Drive	220/60	\$400.00	Relay Rack
142		42	Synchronous, 1, 2, 3, 5, 6, 10, 15, 30 LPS	115/60	\$410.00	Relay Rack
142		42	Synchronous, 1, 2, 3, 5, 6, 10, 15, 30 LPS	115/50	\$410.00	Relay Rack
142		42	Synchronous, 1, 2, 3, 5, 6, 10, 15, 30 LPS	230/60	\$420.00	Relay Rack
142		42	Synchronous, 1, 2, 3, 5, 6, 10, 15, 30 LPS	230/50	\$420.00	Relay Rack
242	601-738	42	Stepping Drive /Fast Advance	115/60	\$465.00	Relay Rack
242	601-740	42	Stepping Drive Fast Advance	220/60	\$475.00	Relay Rack
342	601-752	42	Variable Speed Drive	115/60	\$465.00	Relay Rack
342	601-754	42	Variable Speed Drive	220/60	\$475.00	Relay Rack
182		82	Synchronous, 1, 2, 3, 5, 6, 10, 15, 30 LPS	115/60	\$545.00	Relay Rack
182		82	Synchronous, 1, 2, 3, 5, 6, 10, 15, 30 LPS	115/50	\$545.00	Relay Rack
182		82	Synchronous, 1, 2, 3, 5, 6, 10, 15, 30 LPS	230/60	\$555.00	Relay Rack
182		82	Synchronous, 1, 2, 3, 5, 6, 10, 15, 30 LPS	230/50	\$555.00	Relay Rack
282	602-186	82	Stepping Drive /Fast Advance	115/60	\$595.00	Relay Rack
282	602-188	82	Stepping Drive Fast Advance	220/60	\$605.00	Relay Rack
382	602-200	82	Variable Speed Drive	115/60	\$595.00	Relay Rack
382	602-202	82	Variable Speed Drive	220/60	\$605.00	Relay Rack

NOTE: When ordering Synchronous Drive Models, specify one of "LPS, Lines Per Second" listed.  
 EXAMPLE: Model 112-30LPS, 115/60.

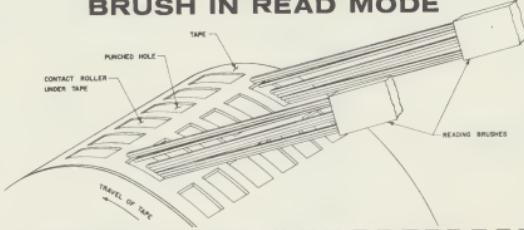
**SHIPPING WEIGHTS**

Model	Weight in Carton	"10%" Discount Schedule for Programmers and Tape Punches
012	7 lbs.	1-3      List ea.
112, 212, 312	17 lbs.	4-5      5%
122, 222, 322	20 lbs.	6-11     10%
142, 242, 342	23 lbs.	12-24    15%
182, 282, 383	25 lbs.	25 and more    20%

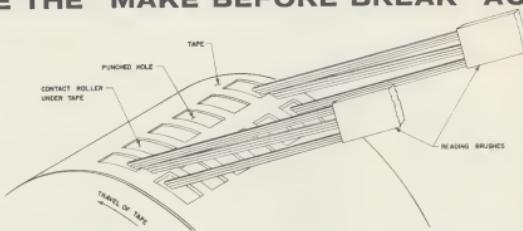
**TAPE PUNCH PRICES & SHIPPING WEIGHTS**

Model	Catalog Number	Price	Weight
12 Channel punch	602-213	\$105.00	10 lbs.
22 Channel punch	602-224	\$110.00	10 lbs.
42 Channel punch	602-235	\$115.00	10 lbs.
82 Channel punch	602-246	\$125.00	15 lbs.

## BRUSH IN READ MODE



## BRUSH IN TRANSFER MODE: NOTE THE "MAKE BEFORE BREAK" ACTION



### TAPE LIFE

The Rope paper/Mylar tape is specially designed for long life in excess of 25 million complete passes through the reader. Samples of the tape will be sent immediately upon request.

### TAPE DUPLICATION SERVICE

Should many tapes of your program be required, the factory has automatic duplicating equipment which can be used to duplicate your program tape. Please contact the factory for prices and details.

### FACTORY MODIFICATIONS AVAILABLE ON SPECIAL ORDER

1. Multiple voltages direct from drum: Several output voltages can be supplied directly from the common drum. This is accomplished by splitting the drum and supplying multiple feeder brushes.
2. Tree circuit output for Binary coding: A special printed circuit relay tree circuit is available for binary outputs. This circuit features plug-in relays and is available for screw terminal wiring or plug-in.
3. Internal Time Based Advance: Tape readers are available with the line advance determined on the base of time. The time program is punched directly into the tape using 9 channels. The remaining channels can be used for load purposes. Any combination of minutes and seconds, or minutes and hours can be supplied for this entirely automatic system.

NOTE: The above modifications are not cataloged due to their special nature, please correspond directly with the factory for specific information and prices.

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**Relay Rack Model****Table Model**

## STATIC CARD READER

### *Description*

The model 4000 card reader controls from 1 to 960 circuits by reading a standard TAB card. The card reader provides simultaneous access to all 960 contact pins on the output side of the card and to individual columns or rows on the input side. This provides extreme flexibility and sustained reliable service under industrial and military operating conditions.

The punched card is inserted in the reader manually, the reader is actuated either with a handle or solenoid, and contact is made through the punched holes in the card. Changing programs is easily accomplished by removing the card and re-inserting another.

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# Specifications

## CIRCUIT READOUT

A maximum of 960 contact pins can be supplied to make contact through a standard TAB card to one of the following:

- A. Common circuit
- B. 12 individual lengthwise rows of the card
- C. 80 vertical columns
- D. Special variations are available since the circuit options are determined by a printed circuit, thereby permitting several voltages to be programmed

## ELECTRICAL RATINGS

- A. Contact pins are rated at 100 milliamperes (non-switching)
- B. Card interface: 10 amp., rated at 115/60 non-inductive
- C. Contact pin wiring: #26 gauge
- D. Other wiring: #22 gauge
- E. Classification: NEMA 1

## MATERIALS

- A. Metal parts: All internal metal parts in the model 4000 are of stainless steel or iridited cadmium plated steel. The contact pins are nickel rhodium and gold plated to provide a hard surface and maximum contact reliability. The external handle and hub are chromium plated.
- B. Enclosure: The reader housing is deep-drawn aluminum case finished with light gray hammertone paint. Reader rating panel made of vermiculite is also available, (as illustrated)
- C. Non-metal parts: Non-metallic parts in the mechanism are phenolic resin impregnated linen laminate or epoxy resin glass cloth laminate
- D. Printed circuit: The printed circuit making contact with the pins is printed on an epoxy glass laminate used for high mechanical strength and temperature stability. The contact surfaces are nickel rhodium and gold plated to provide a hard surface and prevent electrolytic action with the contact pins

## DUST TIGHTNESS

- A. Card insertion door: hinged and dust tight
- B. Enclosure cover: dust tight
- C. Operating handle shaft: provided with a dust seal

## OPERATION

The punched card is inserted in the reader through the door in the front of the unit. Operation of the reader handle moves the card and printed circuit board into contact with the contact pins. Handle movement at the end of the operating arc locks the reader in place by toggle action. Those areas on the card which have been punched will allow contact to be made between the contact pins and the printed circuit matrix. The material of the card prevents circuit completion in unpunched areas of the card. Card removal is accomplished by reversing the above operation. Correct card placement is assured through a position sensing mechanism. If the card is properly placed in the reader a sensing switch will close, allowing current to flow to reading mechanism. Improper card insertion automatically prevents reading mechanism to come into contact with card. Both conditions, GO or NO GO are indicated by lights mounted on the front surface of the card reader.

- A. Total handle travel: 150 degrees
- B. Handle travel for reader closure: 150 degrees maximum
- C. "Card in read position" limit switch actuates 30 degrees before maximum

## SAFETY INTERLOCKS AND INDICATING LIGHTS

A safety interlock is built into the handle mechanism to prevent handle operation if a card is improperly inserted. A pilot light informs operator that card position is correct.

- A. Proper card insertion: a mechanical interlock is provided for an upper left diagonal cut on the card (card is inserted upper edge first)
- B. Card in place: amber light ON
- C. Card incorrectly placed: red pilot light ON
- D. Card in place, reader closed and functioning

## MAINTENANCE

- A. Ollite bearings require no lubrication
- B. Cleaning of printed circuit board easily accomplished through card slot opening.
- C. Cover easily removed for access to entire mechanism and wiring

## PROGRAMMED CIRCUIT WIRING

1. Contact Pins:
  - A. The contact pins and printed circuit can be wired to suit customers requirements
  - B. All connections can be brought out individually
  - C. The 960 pins can be interwired within the card reader to minimize the number of external connections

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